AVIATION

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Double parachute descents at Camp Silzer, N. J.

Photo Underwood & Underwood

VOLUME XVII

NUMBER 9

SPECIAL FEATURES

A MAN-DRIVEN DIRIGIBLE

FRENCH AIRCRAFT CONSTRUCTION IN 1923

RESERVE OFFICERS MAKE CROSS COUNTRY FLIGHT

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CONTENTS

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AVIATION

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The Naval Value of the Shenandoah

A VERY significant statement regarding the Shenandoah has appeared in *The Army and Navy Journal*. AVIATION has never presumed to express pronounced views as to the naval utility of lighter-than-air aircraft with the fleet when operating against a fleet properly equipped with airplanes.

There have been many opinions expressed pro and con, but until the trials are completed and naval officers state definitely that lighter-than-air auxiliaries are valuable, it is not advisable to prejudge the issue. That it is even suggested that the Shenandoah and ZR3 may be placed in commercial service indicates the uncertainty that prevails.

AVIATION has very decided opinions about the Navy operating commercial aircraft enterprises which will be expressed if the naval uses of lighter-than-air are questioned.

The Army and Navy Journal makes the situation very clear.

"But the military value of this type of airship has been questioned both in and out of the Navy. Up in Congress there has been considerable criticism on account of the expenditures for the Shenandoah and the ZR3, which has been built in Germany. Under the treaty, it is a question whether the ZR3 can be used for military purposes. The treaty prohibits the building of any military airships in Germany. There is a limit of 30,000 cubic meters even on commercial ships but the Allied and associated powers made one exception and authorized the Zeppelin Company of Germany to build the ZR3, which has a gas capacity of 70,000 cubic meters or 2,500,000 cubic feet. This is about two and one-half times the limit fixed by the treaty.

"Except the United States were permitted under the treaty to attach the ZR3 to the fleet, it is not built for military purposes. It is a luxurious passenger-carrying ship. In every respect a commercial aircraft, it is built more for safety and comfort than for cruising with the fleet.

On this account the tests of the Shenandoah, which are now in progress, are regarded as of the highest importance at this time. The subject has been discussed extensively at the Naval War College and the General Board. There have been really two schools of thought developed in the discussion, and the claims of the supporters of the Shenandoah type will be given a thorough test.

"It is important that these tests should be made at this time so that the reports can be submitted to the Congress. If the Shenandoah proves an effective unit of the Fleet, the construction of sister ships will doubtless be recommended. If it does not prove effective it, with the ZR3 will be placed in commercial service."

Defense Day and No Airplanes

DEFENSE DAY is all right. It is a good idea to have our defenders get together, so we can see if they are all here; it is a good thing to run the machine, to see if it will still go.

But the most important part of our defense plan will not be looked after; we will not find out why we are hopelessly in the rear as regards airplanes.

We will not learn why our vast appropriations for airplanes were spent for everything except airplanes.

And this is a glaring fault of administration, which, by the way, none of the Presidential candidates seem to think worth their attention.

Other nations prepare to fill the sky with every form of death-hurling planes, but we content ourselves with breaking a speed record here and a long distance record there—things which stir the imagination and point military morals to other nations, which profit by them.

Japan reduces the size of her army and correspondingly increases her air force, but we spend our energies, scattering olive branches among foreign nations.

With an air force strong enough to make everybody keep off our sky, we can live our life in peace, but our nation old indifference binds us in a silly complacency that is the marvel of all who think about the matter.

There is but one defense for our criminal negligence, and it is insanity.

It might be that an examination would show our skulls to be too thick in some places and too thin in others.

Possibly certain of our glands are missing or other glands too highly developed.

It may be that somebody once struck us with a chair or that, as a nation, we sometime fell down stairs or that a long reading of degenerate philosophy has left its indelible mental pennity.

As it is fashionable now for everybody to have a "complex" of some kind, possibly all of us have an aggregate one.

Certain it is that any of the criminal lawyers now performing sleight of hand performances in behalf of murders could take our national asininity in the airplane matter and have us adjudged "mentally ill," if not thoroughly unbalanced.—*Washington Herald.*

The Locatelli Rescue

TOO great praise cannot be given to the United States Navy for the rescue of Antonio Locatelli, the Italian aviator. Acts of this kind cement international relations more firmly than all the "hands-across-the-sea" speeches ever made.

A Man-Driven Dirigible

By LIEUT.-COL. UMBERTO NOBILE

Director of Italian Lighter-than-Air Construction

Some time ago, I had in mind a small "man-driven dirigible" in which, by means of transmission devices analogous to those of bicycles, the muscular force of the passengers themselves would be utilized for propulsion. I called such a singular and original airship "Cycle-Airship." Due to its very nature and to its limited velocity, the cycle-airship naturally could only be used for sporting purposes. In view of the originality of the subject and of the singular results obtained, some of which I had not even foreseen, I deem it of sufficient interest to warrant setting forth the conclusions I have reached in the matter.

Fundamental Requisites

The following fundamental requisites characterizing the new machine may be established:

1. With the cycle-airship there is no consumption of fuel in the accepted sense. Actually the human motor is also a combustion motor, the efficiency of which is not inferior to that obtaining in the best internal combustion engines. At all events, it is proper to state that during navigation the weight of the cycle-airship remains constant without having recourse to the addition of air ballast. Consequently, during navigation at a constant altitude, it is not necessary to introduce air ballast into the compensation chamber, as practised in ordinary dirigibles. The result is that the volume of said chamber, which must be determined only in accordance with the maximum navigating altitude (which for obvious reasons we assume to be comparatively low) is very limited. Thus for a navigating altitude of 500 m., it is sufficient that the air chamber have a capacity of about one-twentieth of the gas chamber.

2. In view of the fact that the capacity of the compensation chamber is reduced to minimum terms, the following important practical consequences are derived:

(a) The variations of form of the gas chamber are minimum even as the fluctuation of the gas, which makes it possible to reduce the number of transversal diaphragms.

(b) The construction of the keel is consequently simplified and lightened.

3. As no combustible fuel is carried on board, the fire hazard is practically eliminated. There is no necessity of isolating the engines from the keel, which always implies an increase in the resistance to advance.

Assuming the keel to consist of a longitudinal beam of triangular section, the men acting as motors may be distributed inside the beam, with or without an intermediate longitudinal transmission shaft, they will maintain in action the propellers suitably distributed along the keel. We may foresee that the penetration of the cycle-airship will be higher than that of an ordinary dirigible.

4. The possibility adduced above of distributing the men along the keel in suitable positions, the consequent diminution of fixed concentrated loads, and the absence of concentrated consumable loads (with the only exception of reserve ballast), lead to the conclusion that the stresses in the keel elements will be minimum and, consequently, the weight of the structures will be reduced to a minimum.

5. Finally, the adoption of men power has another consequence, namely, the great facility of maintaining a given longitudinal attitude during navigation, due to the possibility of avoiding every sensible variation in the size and distribution of the loads.

Dead Weight of the Cycle-Airship

In view of the above, the dead weight of the dirigible, including the hull and all accessories thereof, the valves and relative controls, the controls in the pilots' car, the instruments and the minimum outfit indispensable for normal navigation lasting 5 or 6 hr., may be calculated approximately, in function of the volume expressed in cubic meters, with the following formula:

$$(1) P\ (Kg) = 2.4V^{-\frac{1}{3}} - 0.10V - 0.006V^{+\frac{1}{3}}$$

This formula I have deduced in accordance with the more general formulas established in my "*Enquiry in regard to the Maximum Limits of Useful Load, Endurance, Altitude and Velocity of Dirigibles*," (published in the *Journal of Civil Engineering*, 1921). Naturally, I took into account the fact that the velocity attainable by the cycle-airship is necessarily low, with the consequent lightening of many elements.

By adding to P the weight of the reserve ballast, which we shall assume to be $0.02V$, and considering a navigating altitude of 500 m., in correspondence of which we shall assume the value of the lifting force to be 1.07 kg. per cu. m., the total available lifting force at said altitude will be:

$$(2) F_a = 0.95V - 2.4V^{-\frac{1}{3}} - 0.006V^{+\frac{1}{3}}$$

a part of which will be absorbed by the weight of the men and another part by the weight of all mechanisms and accessories for the transmission of motion and by the weight of the propellers and relative supports. For each man we shall assume 70 kg. weight proper, 5 kg. for the seat, 5 kg. for various commodities and supplies, 20 kg. for the relative traction of weight of the moto-propulsive mechanism, in all 100 kg.

Lt. Col. Umberto Nobile, Director of Italian Lighter-than-Air Construction in civilian clothes. The King of Italy is facing the camera.

The number of *passenger-motors* transportable in the cycle-airship will consequently be expressed approximately by

$$(3) n = \frac{1}{100}\left(0.95V - 2.4V^{-\frac{1}{3}} - 0.006V^{+\frac{1}{3}}\right)$$

which formula reveals the existence of a maximum value of n, which however is reached only with a very large volume.

Maximum value of $\frac{n}{V}$. By deriving with respect to V the trinomial which constitutes the second member of (1) and by putting it equal zero, we get

$$0.95V^{-\frac{4}{3}} - 1.0 - 0.0081^{-\frac{2}{3}} = 0$$

and assuming $V^{\frac{1}{3}} = X$ we get, in solving the equation, $V = 1{,}613{,}000$ cu. meters, and in correspondence $n = 3630$.

The idea of an airship of such colossal dimensions, driven by a small army of cyclists, suitably distributed along the keel, and all pedalling uniformly, is undoubtedly very attractive, but assuredly, nobody would think of materializing it, also because the sporting purpose would be lost in such an enormous construction. For this reason, the research of the maximum value of n has a purely theoretical value.

Maximum Value of $\frac{n}{V}$. It is much more important to investigate the variation of the ratio $\frac{n}{V}$ and to determine if a value of V exists, for which said ratio attains a maximum. This ratio is in fact the most important index for the practical utilization of the cycle-airship. From (3) we get

$$(4) \frac{n}{V} = \frac{1}{100}\left(0.95 - 2.4V^{-\frac{4}{3}} - 0.006V^{-\frac{2}{3}}\right)$$

By deriving with respect to V the second member and by putting it equal zero, we find this time a very reasonable volume (*) $V = 8000$ cu. m., and in correspondence, $\frac{n}{V} = \frac{5680}{8000} = .717$; that is seven men for every thousand cubic meters.

Velocity of the Cycle Airship

Let us now discuss the question of velocity, the most important and essential element in this problem.

The mechanical power developed by the average man is a quantity which varies not only according to the kind of muscular activity which furnishes the energy, but also to the duration of said activity and to the distribution of the indispensable periods of rest.

In the most favorable conditions, we may assume that the mechanical work produced in a day of 8 hr. of actual work is 360,000 kgm., which is equivalent to the development of 10.4 kgm. power per second. By decreasing the duration of the daily work it is possible to increase the intensity, that is, the power.

In the case of the ordinary bicycle, one of the most advantageous applications of human energy has been obtained, because it utilizes the muscles of the legs, which are the most powerful of the human organism.

In order to establish a few figures, let us assume that cyclist is able to climb a road with a gradient of 20/1000 at the speed of 18 km./hr.

Let us calculate the resistance to advance by means of the formula $R = (0.012 + 0.020)\ Q + 0.073\ Su^2$ in which the value of Q, aggregate weight of the cycle and cyclist, is assumed to be 80 kg., S, frontal section of the body of the cyclist, is assumed to be $m^2\ 0.6$, and V, velocity, 5 m. per sec. Consequently, we get $R = 3.66$ kg. Therefore, in such conditions the cyclist develops a power of 18.3 kgm. per sec.

With the same expenditure of energy, the velocity on a level would reach the maximum value given by $0.96 + 0.0411^{\frac{1}{3}} = 3.66$ that is $V = 7.84$ m. per sec., which is equivalent to 28.2 km./hr.

In the case of the cycle-airship we shall assume that each man can develop a power of at least 15 kgm. for a period of time of 5 hr. continuously (except for a few brief pauses for rest). Furthermore, we shall assume that for a short period of time said power may be doubled, and finally that for a few seconds it may be even quintupled, reaching the value of 1 hp. Consequently, we shall distinguish three velocities:

A velocity (normal) corresponding to the power of 15 kgm.

A velocity (forced) corresponding to the power of 30 kgm.

A velocity (maximum instantaneous) corresponding to the power of 75 kgm.

In general, by calling π the power developed by each man, and assuming in conformity with the premises made above, rather a low value for the coefficient of resistance to advance, the velocity can be calculated by means of the formula

$$(5) V = 15{,}000\ \frac{\pi n}{V^{+4}}$$

and substituting in it the value of n given by (3):

$$(6) V = 150\pi\left(0.95V^{-\frac{4}{3}} - 2.4 - 0.006V^{+\frac{2}{3}}\right)$$

It attains a maximum value, which is encountered in the case of a value of V which is independent of the value of π. By deriving (6) with respect to V and by putting it equal to zero, we get in round figures $V = 500{,}000$ cu. m., and consequently $V^{\frac{1}{3}} = 5310$, from which the following maximum values of v:

For the normal velocity, 43 km./hr.

For the forced velocity, 54 km./hr.

For the maximum instantaneous velocity, 62 km./hr.

It is expedient to calculate the velocity corresponding to the volume of 8000 cu. m., for which volume, as previously stated, the ratio $\frac{n}{V}$ attains a maximum value. We get $v = 2130$ and, therefore:

Normal velocity, 32 km./hr.

Forced velocity, 40 km./hr.

Maximum instantaneous velocity, 46 km./hr.

Optimum Value of V: I shall call optimum value of V that value of the volume which makes the ratio $\frac{nv}{V}$ attain a maximum.

From the annexed table said maximum is shown to be equal to 0.253 (number of men, kilometers per hour and per cubic meter) and is encountered for a volume of 50,000 cu. m.

Practically, this optimum value is of no great importance because the variation of $\frac{nv}{V}$ around it, for a sufficient wide range of the volumes, is very small. For instance, for a volume of 15,000 cu. m., the value of $\frac{nv}{V}$ differs from the maximum only by 5.5 per cent, and for a volume of 100,000 cu. m. the difference is only 2.8 per cent.

Concluding, we may state that in order to secure a high degree of efficiency of the cycle-airship, it is expedient to not go lower than 2500 cu. m., nor exceed 20 or 30,000 cu. m.

Endurance of the Cycle Airship

By endurance of the cycle-airship we understand the maximum duration of navigation which it is able to fly without a stoppage.

In the cycle-airship there is no consumption except the food required by the crew. Theoretically, therefore, having a sufficient supply of foodstuffs, it would be possible to navigate several days, until the losses of gas due to permeability of the fabric actually reduced the lifting force. However, as soon as the navigation exceeds 5 or 6 hr. it is indispensable to rest the "human motor," which is tantamount to a diminution of motor power and consequently also of velocity. The endurance, therefore, cannot be increased except at the expense of velocity, so, for instance, doubling the endurance signifies reducing the velocity by 21 per cent. Now the velocity of the cycle-airship is already so low that really a further reduction does not appear advisable.

Maximum Altitude

In the above calculations it has been assumed that navigation is effected at an altitude of not over 500 m. above sea level. If it is desired to increase the altitude, a part of the available lifting force which we have assumed to have been entirely absorbed by the weight of the "men-motors" must be sacrificed. So, consequently, in order to reach an altitude of 3500/4000 m., it is necessary to reduce the number of men by one half. It follows, therefore, that the velocity also would in this case be considerably reduced. On the other hand, we hold that the reduction of velocity obtains in a somewhat minor measure then in the case of a dirigible whose power plant is an internal combustion engine, because in all probability the human power decreases less rapidly than the density of the surrounding air.

Thus leads to a consequence peculiar to the man-driven dirigible, that, by increasing the altitude, the velocity of the cycle-airship increases instead of remaining nearly constant as in the case of the mechanically driven airship.

Comparison with Other Auto-Transport Means

It is readily perceived that of all human means of auto-

(*) Note: It was to be expected in accordance with the results of the above study. It clearly results from it that the volume with which the maximum utilization coefficient is attained decreases on the varying of the lifting force.

transportation, the cycle-airship should be the fastest and also the most economical, economical in the sense that the expenditure of energy for each unit of actual transportation work is small

In the case of the ordinary bicycle we have seen that a man is able to advance at the velocity of about 28 km./hr. with an expenditure of 3.66 kgm. per meter. In walking, an expenditure of energy of 4.15 kgm. per meter corresponds to the economical velocity of 4.500 km./hr

In the case of the cycle-airship, the aggregate resistance to advance in function of the volume expressed in cubic meters and of the velocity expressed in kilometers/hour is calculated by means of the following formula which is readily reduced from (5)

$$R = 10^{-4}\ 244 V^{2/3} v^2\ Kg$$

Consequently, the expenditure of work for each man transported, and for every meter covered, is

$$R = 10^{-4}\ .244\ \frac{V^{2/3} v^2}{n}\ Kgm\ ,$$

and as, for the values with which we are now concerned, we get approximately

$$\frac{R}{n} = \frac{7}{1000} V$$

we get finally:

$$\frac{R}{n} = \frac{35}{1000} \frac{v^2}{V^{1/3}}$$

that is, the expenditure decreases as V increases.

For $V = 8000$ and $v = 1000$, we get $\frac{R}{n} = 1.75$ kgm.,

that is, the unitary expenditure of traction with a cycle-airship of 8000 cu m in volume, is about one half that of the ordinary bicycle, which, undoubtedly, of all the existing auto-transportation means, requires the least expenditure of energy

Possible of Realization

In conclusion, a man-driven dirigible—the most economical of all auto transportation means as far as expenditure of energy is concerned is possible of realization However, while the cycle-airship undoubtedly possesses a great number of advantages as explained above, its velocity is rather low seeing that velocities greater than 30 or 40 km cannot normally be expected

This low value of the velocity limits the field of application of the cycle-airship to purely sporting manifestations, which, however, are not to be despised in view of the great encouragement which would be given to designers in searching for improved penetration of dirigible hulls.

A further increase of the velocity could be secured, apart from reducing to a minimum the pernicious resistances, by a rational training of the "human motors," but said increase could be but slight Suffice it to consider that the velocity increases only 26 per cent when the motive power is doubled

As far as the most suitable volume is concerned, I am of the opinion that 8000 cu m is adequate Greater volumes are not advisable, and on the other hand the small increase in velocity obtained would not sufficiently compensate the practical difficulties of different kinds pertinent to the construction and control of a cycle-airship of large dimensions

b cubic meters	n	$\frac{n}{180}$ — V	v kilometers per hour	$\frac{vn}{V}$
500	81	0 450	23 5	0 132
1,000	85	0 480	24 4	0 159
2 500	17 4	0 695	27 8	0 193
5,000	36 3	0 727	30 1	0 313
7,500	53 2	0 710	31 5	0 324
10 000	71.1	0 711	32 6	0 251
15 000	105 7	0 704	33 9	0 239
20 000	138 8	0 694	35 1	0 244
25 000	174 1	0 696	35 7	0 247
40 000	289 9	0 675	37 3	0 252
55 000	462 3	0 640	38 3	0 255
70 000	651 2	0 645	38 1	0 252
85 000	830 8	0 632	38 7	0 251
100 000	915 7	0 818	40 1	0 247

Second Annual Convention of N.A.A.

On July 21, Frederick B Patterson, President of the N A A., sent out to members the following call for the annual convention of the association, to be held during the International Air Races.

The Annual Convention of the National Aeronautic Association of U S A., Inc., is hereby called, and in conformity with the action of the board of governors will be held at Dayton, Ohio, Oct. 2, 3 and 4, 1924

Purpose—The convention is called for the purpose of electing officers for the ensuing year, amending the national by-laws, and for the transaction of such other business as may be brought before it.

Representation—Representation in the convention shall be by states and chapters. Each chapter shall be entitled to one delegate and one alternate and one additional delegate and one additional alternate for each 25 members or major portion thereof from such chapters according to the records of the national treasurer sixty days prior to the date of the national convention.

Each state shall be entitled to one delegate and one alternate and one additional delegate and one additional alternate for each 25 members or major portion thereof from such state, not included in chapters, according to the records of the national treasurer sixty days prior to the date of the national convention

Alternates—Each chapter and each state is entitled to sent in the convention a number of alternates equal to the number of delegates from that organization Such alternates shall have the right to the floor, to serve on committees and all other rights of delegates except voting. The selection of alternates to represent absent delegates is a matter for decision within the respective delegations.

Board of Governors—The term of office of the Board of governors expires with the adjournment of the national convention The term of office of the new Board of Governors will commence immediately thereafter

A meeting of the present board of governors will be held at 8 p m Oct 1, at convention headquarters in the Miami Hotel

A meeting of the new board of governors will convene within twenty-four hours after the adjournment of the national convention

Guests—All members in good standing of the National Aeronautic Association are cordially invited to attend all sessions of the convention but will not have the right to the floor, to serve on committees or act in any way as delegates and alternates without express permission of the convention.

All delegates and alternates are urged to invite to attend the convention those persons in their localities interested in aeronautics and desirous of witnessing the business sessions of the convention

Reduced Rate on Railroads—Reduced rates of one and one-half fare have been granted on practically all railroads within the United States on the certificate plan The individual on purchasing his one-way ticket in his home town should request of the ticket agent a certificate. If such certificate is not available at that office, obtain from the ticket agent a receipt These certificates or receipts should be deposited at convention headquarters immediately upon arrival After validation they will be returned and upon presentation to the Dayton ticket agent, a return ticket at one-half fare may be purchased.

The above reduction is absolutely dependent upon 250 certificates being deposited at convention headquarters

Headquarters—Convention headquarters will be established in the Hotel Miami where the business sessions of the convention including district and state caucuses and committee meetings will be held

Hotel Reservations—It is the desire of the Dayton committee and of the Dayton chapter of the N A A that delegates and alternates to the convention receive preference in the hotel reservations. As far as possible similar preference will be extended to N A A members other than delegates. Delegates and alternates are requested to write for reservations to Hugh W Robertson, Air Race Headquarters Realty Bldg, Dayton, Ohio, and other N A A members to the Housing Committee at the same address.

Reserve Officers Make Cross Country Flight

Successful Course Completed at Richards Field, Kans.

By STEPHEN D. DAY

The climax of a successful two weeks training period at Richards Field, Kansas City, for reserve officers, was a cross country flight in Army DeHaviland's to St. Louis and return. The flight was led by a reserve officer, Maj Ralph E. Spake, and the ships were flown by reserve officers.

Seven men made the trip without any mishap whatever, flying compass course from Kansas City to Bridgeton Field, St. Louis, in 2 hr 15 min flying time. The ships were sent off at 10 min. intervals in spite of the fact that the day was rainy, cloudy and misty generally. Visibility was very low, and all in all weather conditions were such that it made the problem of navigation a very interesting one.

This flight was made possible only by the remarkable instructions and training which the reserve officers received from the 16th U S. Observation Squadron, Fort Riley, Kans., but which is stationed every year at Richards Field to train reserve officers in three camps Maj Clarence L Tinker and Capt Thomas Boland, who command the 16th Squadron, had prepared a course, which, while stiff, was in no sense irksome, so that a maximum of flying and military knowledge was imparted during the short period of training Flying was the order of the day from 7:00 a m until noon. In the afternoon there were classes from 1:00 to 4:00 and again from 6:00 to 8:00. At the end of the two weeks period there was a written examination, which necessitated considerable boning on the part of the students Every man must pass his 609 physical examination before he can receive the training, either as a pilot or observer

Reserve officers who completed a two weeks' refresher course with a flight in DH's from Richards Field, Kansas City to St Louis and return. From left to right: First Lieuts. William Campbell, Edward Hedrick and William Romley, Capt. William Hargebraad; First Lieuts Fenton Caldwell and George Long, Capts Stephen D. Day and Thomas Boland; Maj Clarence L Tinker; Sec Lieut. Clarence T. Lowell; First Lieuts Olaf Olsen, William Lang and Euland Curtis; Sec Lieut. R. S. Whiting, Maj Ralph E Spake and Capt C T. Venn

During the two weeks training every eligible pilot and observer received an average of 20 hr flying time. All pilots who passed 609 medical examination, were soloed on Jennies and DH's without any accident to mar the course of training. The official records of the Squadron show that 2088 flights were made during the two weeks or a total flying time of 488 hr 25 min.

It is hoped these camps continue to receive the support of the Army, for while we are not desirous of too paternal a government, there is another form of relationship which is of very great benefit to all of us, that is—the big brother attitude which the army is showing in full measure toward the reserve officers.

It is believed that this is the first time reserve officers have been permitted to navigate ships of this type on a cross country flight, and the fact that every detail of the trip was carried out as originally planned, without change or deviation, proves that the trust of the officer in command of the field, in permitting the flight, was not misplaced

The ships left Richards Field at 10 min. intervals, beginning at twelve o'clock, July 12, and arriving on schedule at Bridgeton Field just 10 min. apart Each ship carried a reserve officer observer, whose duty it was to make a log of the journey and to aid in every way possible in making the flight successful. After the ships had all landed and on the line the officers were royally greeted by the National Guard Unit of Missouri, which is stationed on Bridgeton Field, and by officials of the Flying Club of St Louis Before leaving the field the ships were serviced, ready for the return flight the next day The Flying Club of St Louis had thoughtfully provided transportation, and it wasn't long before everyone was quartered at the Hotel Melbourne

On the day following, at two o'clock, motors were started up and everything prepared for the return journey. This time it was to be in tight formation, led by Maj Ralph E Spake with Capt. Stephen D. Day, observer. All ships took off together, and circled the field once, waving goodby to their friends on the ground.

The return trip was uneventful except for the remarkable skill in the manner in which the formation was held by the ships for the entire journey. Just 2 hr 25 min actual time, and the formation swept over Richards Field, and at a signal from the command plane broke off to the right and left, two by two, landing in couples

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First Inverted Aircraft Engine

A letter from Adrian Van Muffling of the Netherlands Aircraft Mfg. Co., New York, takes exception to the statement recently made in AVIATION that the Germans were the first to experiment with inverted aircraft engines. The writer states that one, W. Cooke, originally of Seattle, flew an airplane in 1923, which was fitted with an inverted two-cycle Roberts engine of 80 hp. This was probably the first engine to be run in an inverted position. The performance was satisfactory except for some fouling of the plugs, which were in the lowest part of the cylinders.

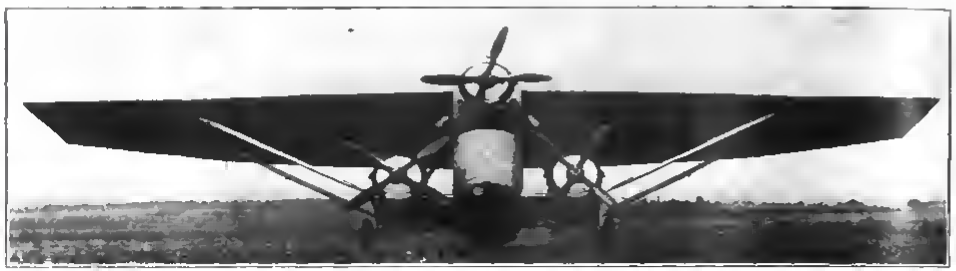
French Aircraft Construction in 1923

As the French "Service Technique de l'Aéronautique" is in a sense the technical body which coordinates the efforts of civil, army, navy and colonial aviation it is to them that we must turn to realize the progress made in aviation during the course of the year.

Taking up the year 1923 is in a sense equivalent to establishing the balance sheet of the Service Technique and that is what we are going to do briefly.

French engine manufacturers made a big effort. The policies of 1922 brought about in 1923 a big result. Up to that time we were only building motors of under 400 hp. 1923 saw the official testing of motors of over 400 hp. A few of these have been tested on aviation fields and on actual air lines and it can be said that the past year has seen the development of motors of almost twice the previous endurance. Among the motors of the year let us cite the Lorraine-Dietrich 440 hp., the Jupiter (built by Gnome and Rhone) 380-400 hp., two Hispanos of 450 hp., one a V and the other a W; the Renault 450 hp. now being tested, the 500 hp. radial Salmson, the Panhard Levassor 500 hp., the 500 hp. geared Farman, and the 420 hp. geared Talbot-Coatalen.

It appears that the motors presented to the Service Technique this year will again show a notable increase in power; that they will reach an average of from 600 to 800 hp. and that they will be actually at work within a year or a year and a half.



New Farman Transport Plane powered with 3 Salmson 300 hp. engines, and equipped for night flying. The ship accommodates 8 passengers, has a washroom and baggage compartment, and is equipped with wireless. It is faster than the previous 4-engined type, and will fly on two engines. Four of the new planes are to be placed in service on the France-Roumanian Line between Paris, Prague and Warsaw.

Military Aeronautics

The airplanes which the Service Technique is called on to examine are of several kinds and follow a program laid out by the various authorities in charge.

Among the military planes there are several worthy of consideration.

a.) Single seater fighters—There is the Dewoitine 300 hp. Hispano-Suiza and the Spad 81, their speed at 4,000 m. has increased by ⅓ and their ceiling by 1000 m.

b) Two place reconnaissance and day bombers—the Potez 15 and the Breguet 19 have appeared, their speed at 2,000 m. has risen from 180 to 220 km./hr.

c) Two place night pursuit planes. The Loire and Olivier has been homologated. Its speed of 190 km./hr. fills the actual needs and its ability to take off and land at night have been particularly studied.

d) Convoy and day bombardment plane—Another Loire and Olivier has been homologated.

Multiplace fighters and large bombers are actually being worked on and some will be tried out this year.

Naval Aeronautics

The navy having let its aerial budget drop to insignificant figures had brought about the disappearance of 7 out of the 8 firms which supplied it at the time of the armistice. The 1923 budget, however, resulted in a very clear financial come back. The construction firms have revived. With the meager program of 1922 there were tested in 1923 several two place bombardment machines of 520 hp. which are quite interesting, but the 1923 budget brought a new development program of 800 hp. bombardment planes which means that one can not hope for good results along this line until the end of the year.

There is also to be noted the testing of a torpedo plane by the Levasseur firm which will soon be replaced by another plane built by the same firm but able to carry a greater load. The problem of the torpedo is more important in this case than that of the plane.

The Service Technique has also had to study the problem of landing and taking a plane off of a battleship fitted simply with a platform.

Civil Aviation and Accessories

The Service Technique has also busied itself with the problem of the dirigibles. They do not know just how many they have studied since the war. They have just been studying a rigid of 75,000 cu. m. They are especially studying now the nonrigids whose role is scouting, as well as nonrigids for the defense of the coasts. One was built in 1923 which is now at the Cuers-Pierrefeu base.

Among the civilian machines are to be noted the large transport planes derived from the bombers and whose types are to be found in the Grand Prix machines of 1923.

The Service Technique has under its dominion all that concerns aviation. Thus it is busy with parachutes. It considers the problem solved. No plane leaves Villacoublay without its pilot being furnished with a parachute. All the material problems are solved, but the psychological problem remains unsolved and this is not within the scope of the Service Technique. There is nothing which will bring about a passenger in an aerial limousine considering the parachute as he does the life preserver on a boat, that is, with indifference. None the less the Service Technique is studying a collective parachute for three people which will let them down through a trap door in the floor of the fuselage. A fuselage with detachable parts had been considered but the difficulties were too great.

The Service Technique has studied aluminum and magnesium alloys. It is trying to generalize the production of magnesium alloys for detached parts. The Breguet Co. has done most in this direction. Interesting results have already been obtained and others will be this year.

If one adds to this the experiments in navigation instruments, fire extinguishers (for which a solution has been found), photographic apparatus, carburetors, radiators, antibackfire devices, compasses, wireless and directional wireless apparatus, etc.; one sees that the French Service Technique gives from the industry or suggests to it interesting innovations in the accessory line.

Still further to be noted are the helicopters. The Service Technique is encouraging Pescarra and Oemichen-Pengot. Without prejudice to the apparatus which are presented to it, the Service Technique thinks that the future lies not with the pure helicopter but with the planes of the helicopter type, and it feels that the problem must be worked on until a definite answer either positive or negative has been reached.

The Service Technique has also been studying the plane mounted with an automatic stabilizer (which will be in operation in 1924) and the distant control of planes.

Such are very briefly the results of 1923. They show that the French Aeronautical industry although it has not obtained all that was hoped for it, at least has not remained inactive any more than has the Service Technique.

American World Flight

With the end of the 26,000-mi. journey in prospect, arrangements for a fitting welcome were being made by government representatives, and reception committees of the municipalities of Boston and New York.

This issue of AVIATION will be in the hands of readers about the time, if there is no further delay in the schedule, that the first enthusiastic greetings are being extended (in the United States) to the homecoming argonauts of the air.

AVIATION will report fully in the next issue the story of last 500 mi. jump to the American continent and the reception of the fliers at Boston and New York.

On Aug. 18 Lieutenants Smith and Nelson attempted to take off for the long flight from Reykjavik, Iceland, to Fredericksdal, on the southern tip of Greenland. There was an oily sea with a big ground swell and due to heavy loads neither machine was able to get off. Lieutenant Smith's plane broke the spreader bar between the pontoons and Lieutenant Nelson's ship suffered a broken propeller. The cruiser Richmond had started on to patrol and it was not until the next day that spare parts arrived and the ships were again ready for flight.

On Aug. 21 the two American planes and that of Lieutenant Locatelli, the Italian flier, left Reykjavik a little after 8 o'clock. All three planes took off with apparent ease. The weather was good for the first part of the trip and the planes were sighted by the cruiser Richmond and the destroyers Reid, Billingsley and Barry. The last 150 mi., however, were flown in fog and rain against a strong head wind and the cruiser Raleigh did not sight the planes. Smith and Nelson became separated, Smith landing at Fredericksdal some 45 min. before Nelson. Lieutenant Smith covered the 825 mi. in 10 hr. 30 min.

The pontoons of both planes seem to have been somewhat damaged by ice and sea in the Harbor at Fredericksdal and bad weather delayed the fliers for a couple of days.

On Aug. 24 the two Americans covered the 126 mi. from Fredericksdal to Ivigut, Greenland, in 2 hr. 29 min. There remain 500 mi. of open ocean between Ivigut and Indian Harbor, Labrador, before the fliers reach the American continent.

Italian Flier Loses Plane

Lieutenant Locatelli who left Reykjavik, Iceland, at the same time as the American fliers, did not reach Greenland. He was last seen by the patrol of destroyers some 200 mi. off the coast of Greenland and leading the Americans by 40 min. Orders from Washington the U. S. destroyers and cruisers started a search, which was much hampered by fog and bad weather. The cruisers Richmond and Raleigh are fitted with catapults and each carried two Vought UO1 ship scout planes, which made several extended patrols. After a search lasting for three days Lieutenant Locatelli and his crew were picked up by the Richmond at 11.35 p. m. on Aug. 24.

It would seem from the meager reports that have come through that the plane was forced down in the fog by motor trouble and drifted some hundred miles before being picked up 125 mi. east of Cape Farewell, Greenland. The crew was uninjured but the plane was reported to be so badly wrecked that it was abandoned at sea.

Shortage of fuel for the cruisers would soon have forced the discontinuance of the search.

Argentine World Flight

On Aug. 19 Major Zanni, the Argentine around the world flier, crashed while taking off from Hanoi, French Indo-China. The machine was completely destroyed but the pilot and his passenger were unhurt. A spare machine is being rushed from Tokio. It is said that Major Zanni contracted a fever at Calcutta from which he was still suffering at the time of the accident.

Watertight Pontoons

Of interest to manufacturers and operators of seaplanes is the information received from L. W. Ferdinand & Co., 152 Kneeland St., Boston, Mass., that Jeffery's waterproof liquid marine glue was used in the construction of the pontoons with which the American Round the World Cruisers are equipped for their over water flights.

The value of a good marine glue for boat and seaplane repairs is indicated in a letter forwarded by Ferdinand & Co. from one of their customers who made leakproof with this glue a boat considered at first to be good only for firewood. Unbleached cotton laid in the glue was used and the writer now considers his boat as good as new.

National Air Policy Suggestions

An aviation pioneer, Maj. A. B. Lambert, of St. Louis, who is a nationally known pharmaceutical manufacturer, who qualified as a balloon pilot in 1908 and an airplane pilot in 1911, and who rendered invaluable service in organizing balloon companies during the War, makes unity of organization and centralization of effort an essential for furthering any national air policy. He writes:

"It is an easy matter to create a national air policy, especially a broad policy to cover all purposes, such as national defence, commercial aviation, scientific research, and the necessity of numerous flying fields.

"The policies of our military organizations are conducive to the development of commercial aviation, especially as pertains to cooperation, and undoubtedly those interested in commercial aviation recognize the vital need of cooperation with our military aviation. Consequently, a policy comes down to a simple text and the writing of a platform, so to speak.

"The one big question is: How are we to materialize a policy?

"(1) Organization.
"(2) Public Sentiment.
"(3) Political influence.
"(4) Publicity.

"If these four items can proceed along parallel lines with a degree of force, a national air policy can be carried out.

"Our efforts should be centralized. One national organization, one executive committee, and all local flying clubs to affiliate and to recognize one supreme authority.

"Local flying clubs seem reluctant to incorporate themselves into the national organization. At present in St. Louis we have members of the N.A.A. who are not members of the flying club and vice-versa.

"This leads to confusion and a lack of definite organization. Eliminate one or the other."

AIRPORTS AND AIRWAYS

Chicago News

By R W Schroeder

A severe wind storm which swept Chicago on Aug 8, played havoc with a number of planes at Chicago fields.

F W Barker of Eagles Flying Circus, reports that pilots James' and Boachard'a ships were picked up and flung fully 50 ft from where they were staked down Boachard's ship was completely washed out, while "James" crate only suffered three smashed wings, a rudder and flipper gone, and slightly damaged radiator

Bob Radoll, another pilot of the Eagles organization, had his ship at Checkerboard Field during the storm and with the aid of Behnecke and some field mechanics managed to keep it on the ground A pilot named Grady, however, had his ship smashed According to report it vaulted a fence and landed on its back ont on Roosevelt Road

At the Heath Airport the storm left in its wake a lot of wreckage and a number of bargains in "knocked-down" airplanes. Among other things, the wind picked up a Canuck wing on the roof of the Heath shop, carried it over to York Place and hlew it into a big grocery store window

The new Elmhurst field was also visited by the storm and three planes at that point are reported to ba washed out

Tim's beautiful MF boat, which was lying on the beach at Belmont Harbor, is a total wreck from the storm.

At Ashburn Field several ships were blown over and badly damaged

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The Heath Airplane Co has bought a Canack from Julian Farwell and flew it down from the Great Lakes last week. Wm Skoda also flew his Canuck back to the Heath field where he will keep it for the time being This field, like all the others, has been pretty wet all week dae to daily thunder storms

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Stanley Wallace's new Standard is flying right along at the River Road field Max Sisson, who acquired his flying experiencea on Fokkers and Rumplers in Germany, is piloting the ship. Oaks and La Parle have moved to another field on River Road, where they are flying their Jennie

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On Aug 5, Ed La Parle and his mother, Mrs Tillie La Parle, 716 Barry Ave, flew to Lake Villa, Ill, to visit friends, remaining over night and returning the next evening Due to heavy rain practically all fields were under water, making a forced landing dangerous. The entire return flight was made in drenching rain

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Richard Boetcher has sold his Laird Swallow to John C. Miller.

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The American Eagle Airways (Chris Lund) have been sold out to Mr Lund's chief pilot Sloniger He is operating the two LS5s, and is showing a parachute act on Sundays, weather permitting, which never fails to draw a big crowd. Brown, a young man working around the ships, is doing the jumping

Harold Kullberg Killed

Aviation in Akron, Ohio, received its hardest blow Aug 5 when Harold A Kullberg, farmer nee and officer of the British Royal Flying Corps, and the founder and first president of the Commercial Aircraft Association, was instantly killed when the JN4 which he was flying crashed to the ground on a farm near Hudson, Ohio With him in death was Henry Danker, a student flier who resided near Hudson

Kullberg had for several years been a leader in aeronautical activities at Akron, where he made his home following his discharge from an English hospital at the close of the war, and after a brief career as a commercial pilot near his birthplace in Sommerville, Mass.

Having been rejected by the American military service because of his short stature, "Kully," as he was known to his friends, enlisted in the R F.C at Toronto, trained at Canadian and American fields and was sent to France and detailed to Squadron 1 of the British flying service

He was officially credited with 14 enemy planes and two balloon and was twice decorated His distinguished flying cross was presented to him by King George after a single-handed engagement with ten German planes in which he shot down two and routed the others.

During the day prior to his last flight, Kullberg had complained of illness and had refused food He was reluctant to make the trip with Dunker but was finally persuaded to go

Careful investigation by members of the Commercial Aircraft Association, physicians, and aero engineers from The Goodyear Tire & Rubber Co, resulted in a statement indicating that Kullberg had been overcome with the heat and was probably unconscious before the fatal dive came. Aug 5 was the hottest day of the summer in Akron

Kullberg's funeral was one of the largest ever held in Akron Following services at a down town church, attended by several hundred of those who knew the popular little flier during his residence here, the casket, draped in American and English flags was taken to Glendale cemetery

While the services were being read before the open grave, two planes, piloted by Larry Dennison and J McLaughlin circled overhead dropping flowers, and a guard of honor from Legion Post 209 fired a final salute for the fallen flier

No successor has been named for Kullberg's post as president of the C A A

A movement is now under way by aeronautical groups in Akron to have the municipal flying field here named after Kullberg

Illinois Model Aero Club News

One of the greatest achievements of the Illinois Model Aero Club was the winning of all the prizes and the Mulvihill Trophy at St Louis last October The Mulvihill trophy was presented on July 2, by Maj R. W. Schroeder to Edward J Lange, who then presented it to the Club, for safe keeping until it is again placed in competition at Dayton in October

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The 13th annual banquet of the Illinois Model Aero Club was held on July 15 The winning team of the Mulvihill contest at the St. Louis Air Races were the guests of honor The Mulvihill trophy was on display, with the winning and other models. Maj R W. Schroeder, Charles Dickinson, James S Stephens, and the Mulvihill Trophy team of the club were the speakers of the evening, with Joseph J. Lucas as toastmaster Several musical numbers were presented by F E Damptz (a club member) and his assistants

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The meet of the Illinois Model Aero Club, which was held on July 27, was very interesting Many contestants were present Mr. Jaras' model made some very good flights. His best time was 2 min 26 sec, which was excellent considering weather conditions.

Paul Shafer Smith entered a new twin propeller model in the contest which flew well. Late in the evening when the weather was calm, Shafer Smith launched his model When the model was in the air for 2 min. 15 sec., the timers lost sight of it After an hour's search, Shafer Smith asked Mr Laird and Mr Dickinson to go up in a Laird Swellow and see if they could spot the model on the ground from the air This they did, and in ten minutes' time located the site where the model had landed

Bertram Pond also made a very creditable flight during the contest His time was 2 min 11 sec.

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On July 29, George E Weaver died of heart disease. Mr Weaver became interested in aviation when he joined the Illinois Model Aero Club to learn about building and flying models. Later he became one of the best designers, builders and fliers in the country. Mr Weaver's death has caused great regret among all the club members.

Cleveland News

By C. Caldwell

Lt Harold R. Harris, U.S.A.S, Chief of Flying Section, McCook Field, landed here en route to Tallulah, La, in the Huff Daland Duster, with Elliot Daland and Master Sergt. W. V. McConnell, U S A S, as passengers.

To correct any misapprehension that the Duster is named after a sometimes grimy household article, I shall state at once that it is a Liberty-engined biplane built by Huff, Daland Co for the Department of Agriculture for use in a series of dust spraying experiments to destroy caterpillars, boll weevils, worms, gypsy moths, and other pests. Congress is not to be sprayed, despite rumors to the contrary.

The plane carries 1200 lb. of calcium arsenate which by high velocity air suction is dragged from the hopper and blown back in the slipstream, falling in a path 225 ft. wide, to the consternation and chagrin of the doomed bugs. As the plane roars along from 18 inches to a few feet above the ground the stronger or more athletic bugs who might resist the arsenate are scared to death anyhow; so those bugs who survive are scarcer than society girls wearing cotton stockings.

Major Sergeant McConnell, Chief Dusting Pilot for the Department of Agriculture, has dusted 700 acres in less than two hours' flying time using a DH carrying only 200 lb. of calcium arsenate With the Duster carrying 1200 lb, 300 acres can be dusted in one flight, as 4 lb per acre is dropped.

To appreciate fully the value of the airplane just picture a farm laborer, preferably one of those sun-kist, chicken-headed cawn-pone consuming cullud boys from way down South trying to spread 4 lb. of elusive dust over 387,000 bugs peramibulating over a whole acre of ground Even allowing that the boy could move fast enough to get near a bug, it is obvious that he couldn't distribute his 4 lb without unduly dusting some bugs and entirely slighting others. The airplane on the other hand, plays no favorites. Of that 4 lb distributed per acre, each bug is presented with his fair share which he may either use at once, or take home to his family and friends

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News item states, "Akron wants Air Mail, and asks that Cleveland field be transferred there"

Akron wants a lot of things—needs them, in fact As the patriotic Mexican said of his country, 'Ah! that so dear Mexico' All she lacks is climate, air, rain, soil, population, and opportunity, to make her a great country F'

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Lawrence D Bell, Vice-President and General Manager of The Glenn L Martin Company, spoke on Aviation at a Rotary Club luncheon at Alliance,, some 50 mi from Cleveland. Leaving his desk at 11:00 o'clock, Mr Bell flew to Alliance in the Martin Commercial Plane in 38 min, spent over 2½ hr there and was back in his office by 3:00 o'clock. By any method of transportation other than the airplane, Mr Bell would have consumed a whole business day to fill this engagement

Pan-American Air Mail

Leon Cuddenback, San Francisco aviation instructor, is in Nicaragua for the purpose of establishing an air mail service between Corinto and Bluefields.

Cuddenback will be assisted in the work of organizing the service by Humberto Diaz, formerly Nicaraguan Consul to San Francisco

Pitcher Goes Up in the Air

A relief pitcher brought by airplane stopped a batting onslaught in a baseball game at St James, Minn., on Aug 14 Le Blanc, hurler of the Mankato team of the Southern Minnesota League, missed his team mates when they left Mankato for St James. A friend offered to take him by airplane. He arrived in time to relieve Mudeking, when the latter blew up, and put a stop to further scoring Mankato won, 5 to 4, and went into the lead in the league race.

Fast Italian Seaplane

The Italian Aero Club on Aug 4, reported that Leandro Passalova, flying a seaplane, made a record of 303 km 370 m. an hour (a little more than 188 mi./hr.) At one time during the flight the machine reached a speed of 310 km./hr No details are given.

The Schneider Cup was won last year at a speed of 177 mi./hr If the above report is true and Passalova's plane is representative of the Italian entries, the race, which is to be held this year at Baltimore, should be an exceedingly close one.

The new Remington-Burnelli freight carrier with two 520 hp Atlantic-Calloway engines and a cargo capacity of 8050 lb

New Landing Field at Santa Cruz, Calif.

On Sept 7 Santa Cruz, Calif, expects to dedicate the city's new landing field to be known as the Santa Cruz-Swanton Aviation Airport. The field is 900 ft. long and 300 ft. wide and is well leveled and graded A landing T is located at the east end and a wind cock at the south end of the field. Bob Hensler, working with the Chamber of Commerce, was responsible for the building of the field The use of the tract of land was made possible by the generosity of F W Swanton

It is planned to make quite a ceremony of the opening of the field and many notables have been invited The owners of more than fifty planes have agreed to be present and there will be exhibition flying, fireworks and a banquet.

Mexico City-Tampico Air Service

The Mexican Government on July 16 signed a contract with the Mexican Aviation Company for the establishment of an airplane service between Mexico City and Tampico, to begin within six weeks. Fifteen planes will be in commission, each carrying three passengers and mail. The concession is for ten years

Notice to Pilots

All pilots in the vicinity of Chicago who desire to fly for their F A I. certificates preliminary to the Dayton Meet, are asked to report at Tony Yuckey's field, 63rd St and Cicero Ave, between the hours of 9:00 a. m and 12:00 noon

Those who may desire can arrange with Mr Yuckey for the use of his machines. Further information may be obtained from R. W Schroeder, Care Underwriters' Laboratories, 207 East Ohio Street, Chicago, Ill

UNITED STATES AIR FORCES

U. S. NAVAL AVIATION

U. S. Army Air Service

Staff Serg Duane Grant Warner, A S, 43d Sch. Squad., Kelly Field, appointed Sec. Lt. and assigned to Selfridge Field, Mount Clemens.

The appointment of the following named Sec Lts. from enlisted men and their assignment to the A S. Prim. Fly. Sch., Brooks Field, is announced: Harold Jefferson Johnson, Carl Joseph Crane, Bryan Maxwell Jacobs, John Randolph Armstrong, William Donald Old, Lawrance Chilton Elliott, Fly Cadet Harry William Coon, Elmer Theodore Rundquist, David Marshall Ramsay, Harold George Peterson, Fly. Cadet George Francis Schulgen, Otto Paul Weyland, Kirtley Jameson Oregg, George Aldridge Whatley, Frank Riley Loyd, Harry William Miller, Fly Cadet Sheldon Brightwell Edwards, Fly Cadet Clarence Steven Thorpe, Paul Ready Oreenhalgh, Howard Hunt Couch, Olenn L. Davasher.

Fly Cadets Reginald Roan Gillespie and Wilfred Joseph Paul appointed Sec. Lts. and assigned to Balloon and Airship School, Scott Field.

Sec. Lt. Halley O Maddox, 12th Cavalry, detailed to A S, from Fort Brown to Coln A S Prim. Fly Sch. Brooks Field.

First Lt. Mark R Woodward, A S, from Bolling Field to Asst. Professorship of Mil Science & Tac., Mass Inst. Tech., Cambridge.

First Lt Elmer E Adler, A S., Fairfield A Int. Dep., Fairfield, to A S Eng. Sch., McCook Field.

First Lt James F Powell, A S, Balloon and Airship Sch., Scott Field, to Phillips Field.

Third Attack Group Builds "Flivver"

A new plane has been designed and constructed by Lieut D B Phillips, with the assistance of Lients. Ray H Clark and Olenn T Lampton, last so many members of the Third Attack Group cooperated that it might well be called a product of the Third Attack Group.

The little ship has a wing spread of 18 ft. It can develop a speed of 115 mi /hr and cruises at 90 mi /hr. It is equipped with the Lawrance 3 cylinder 60 hp radial engine and carries sufficient fuel for 4 hr at full throttle or 5½ hr at cruising speed, or approximately 450 mi cruising radius. The landing speed is 50 mi /hr.

Other data on plane follows: Weight (less engine) 305 lb., weight of engine 175 lb., weight of pilot, 180 lb., weight of fuel, 120 lb., total weight carried, 780 lb. Wing section, U S A 27, upper wing, 36 in., chord, lower wing, 30 in., climb, 600 ft /min., ceiling, 12,000 ft; factor of safety, 6, gasoline capacity, 22½ gal; oil, 9 qt.

The gasoline is carried in two tanks, a pressure tank behind the pilot and a gravity tank near the engine. By a simple arrangement of valves, the gasoline can be transferred from one tank to the other while in flight so as to balance the plane.

The ship is very "snappy" on the controls, and at speeds of over 100 mi./hr., it is hardly necessary to "dish" to cause it to make a turn or perform some other evolution. At cruising speed it is comfortable. It lands easily when the pilot becomes accustomed to the low under carriage and it handles exceptionally well in taxiing.

The ship is notably clear in design. The usual center section struts and wires have been replaced by a plywood 6n, as in the Army Curtiss racer of 1922. The flying and landing wires are streamline RAF wire. The tail surfaces are entirely without external bracing and all control wires are enclosed. The tailskid is a single spring leaf, almost parallel to the airstream. Many hours were spent on the problem of reducing the fuselage cross-section to the smallest area consistent with a reasonable degree of comfort for the pilot. Even the bolt-heads, which usually project from fittings, have been counter-sunk so as to eliminate every possible cause of resistance.

Lieutenant Phillips, who is now stationed at McCook Field, flew the plane up from Texas arriving in Dayton on Aug 14.

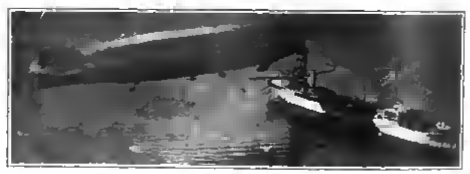
Major Hensley Broadcasts From Airplane

Flying high over Central Park in New York on Aug 14, Maj. William Hensley of Mitchel Field, Long Island, spoke and his voice was heard by thousands of radio fans in the metropolitan district. The plane used was a DH4B piloted by Lieut S. M Connell and fitted with a Signal Corps wireless sending and receiving set. The messages were picked up by a superhetrodyne set in Central Park and forwarded by a special wire to the Station WJZ of the Radio Corporation of America in the Aeolian Building, New York. Here the current was amplified and sent out as part of the regular broadcasting from the station. Lester D Gardner, publisher of AVIATION, was on the microphone in Central Park. His questions and Major Hensley's answers were clearly heard by the radio audience, and the experiment received much publicity.

U. S. NAVAL AVIATION

The Shenandoah Maneuvers with Fleet

The Shenandoah has been conducting a most interesting series of experiments for the last two weeks to ascertain its fitness for work with the fleet. The first of these was the mooring of the ship to the Navy tanker Patoka which has been fitted with a mooring mast and is used as a mother ship. The second was a long cruise at sea to locate the "enemy" fleet.



The Shenandoah moored to the Patoka and riding at right angles to the mother ship

On Aug 8, the big dirigible left Lakehurst and reached Narragansett Bay, R. I., some 5½ hr later. The ship cruised around for some time and at seven in the evening, when the tide was turning and there was little wind, the Shenandoah slowly dropped down and let fall about 1000 ft. of line. She then maneuvered so that the line could be picked up by the mother ship.

Then, with the mother ship and the dirigible drifting slowly with the turn of the tide, the Patoka maintaining just enough headway to keep into the light wind, the cable was hauled in. Two or three times the Shenandoah discharged ballast, dipping and rising as she was drawn into the mast on the Patoka's stern. It took about an hour to complete the mooring operation. The Shenandoah remained at the mast for about 24 hr., after which she returned to Lakehurst.

Curiously enough when the air is perfectly still it seems comparatively difficult to hold the dirigible at the mast for the stern tends to slowly rise or fall and there is no method at control except shifting the water ballast.

The second experiment was a maneuver of some 1,300 mi. with the scouting forces of the Atlantic fleet. The Shenandoah was away from the hangar for 72 hr. and cruised steadily for 40 hr. The flight extended some 450 mi. off the Atlantic coast and 250 mi. north of Bermuda in a long sweep made in search of four "enemy" ships. One of these was sighted 170 mi from Delaware Breakwater and "destroyed."

The most interesting part of the flight was the fact that the water recovery apparatus functioned so well that it was necessary to valve any helium although the ship consumed 9,500 lb of fuel during the trip.

Naval Air Orders

First Lt F M Howard, detached M. B. Quantico, Va., to N.A.S., Pensacola.

The following named officers detached M.B., Quantico, to N.A.S., Pensacola: First Lt G B Hall, Sec. Lt. J. D. Christie; Sec Lt. C. C. Jerome, Sec Lt J. O. Hopper, Sec. Lt H. S. Levis.

Lt. Ralph E. Davison upon exp leave to N.A.S, Pensacola.

Ens. William B Ault det U.S.S. Arkansas, to temp. duty under instr. N.A.S., Pensacola.

Lieut. Giles E. Short, det Aircraft Sqd. Scing Fleet, to N.A.S. Coco Solo, C. Z., involving flying.

Lieut. Otto W. Grisier det Dest. Squad., Battle Flt. to N.A.S., San Diego.

Lieut John B Kuerp det. Off Gen Insptr Nav Aircft., Central Dist., McCook Field, to Insptr. Nav Aircft. Cent. Dist., McCook Field.

BACKFIRES

"On reading the *Chicago Tribune* of June 14," says David Eaton of Kalamazoo, Mich., "I came upon this little passage which I am enclosing.

"If Lieutenant Smith really told it to the *Tribune* he must have had a good laugh to himself. I think this is worth putting in the Backfires column.

"We had a thrilling experience while crossing the mountains," Lieut. Smith is quoted in the *Tribune*. "We had to fly single file through a canyon in narrow the wing tips touched the canyon wall frequently. Down below was a wild torrent, and above thick clouds. We were lucky to get through."

Adventurers In the Sky

(Editorial in the Herald and Examiner, Chicago, August 9, 1924)

OVER the heedless millions of Chicago, at 8 o'clock each morning and again at 6.30 in the evening, a mail plane wings its way from coast to coast.

Upon the outspread pages of the sky the pilots of this Transcontinental Air Mail Service are writing daily before our eyes a new epic into the history of the United States.

The Postmaster General has just given out his report on the first month's operation of the service. A plain, colorless document, it yet breathes of the great adventure, the brilliant romance of our time. "Out of the first twenty nights of flying there were only six with clear weather straight through from Chicago to Cheyenne," says the report. "Most of the time the air mail pilots encountered cloudbursts and tornadoes and severe electrical storms, which proved a greater menace to aviation than more severe rain and snow storms experienced in other seasons of the year."

One mile of every three, or almost 60,000, was flown at night and through storms!

"In spite of bad weather during most of the night flying," the report says colorlessly, "the schedule was maintained without accidents worthy of name."

"The schedule was maintained!"

These four bald words tell the story of a thrilling battle with Nature and the dark.

The pilots of the Transcontinental Air Mail Service are among the foremost pioneers of our time, and the great adventure of these couriers of civilization's new day is in the service of their country.

A Suggested National Air Policy

That a National Aviation Policy is needed by the United States is obvious. To get such a policy in concrete form AVIATION *requested several thoughtful friends of aeronautical progress to make suggestive and constructive recommendations. Some of them are given below and will be printed each week with additions, omissions and such other changes as appear to be helpful toward the formulation of a sound national air policy. Readers of* AVIATION *and others can render no greater service to the cause of aeronautical progress than contributing their comments and suggestions.*

GOVERNMENTAL.

A continuing program of aircraft development both governmental and commercial.
A civilian, charged with championing a national air policy, is needed in the Government. *Cabinet
Aircraft committees in the House and Senate to hold aircraft hearings where civilians as well as government officials can express their opinions. *composed of fliers.
A detailed aircraft budget for all Governmental Departments, and an annual statement of all expenditures.
An experienced staff of flying officers at the head of all governmental air defense services.
Coordination of all procurement and experimental aircraft work of the government under one agency.
*Co-ordination of the aircraft experimental development of the government leaving procurement to the various branches themselves.
Limitation of government manufacture to repair of aircraft and specialized work that cannot be done by private firms. *No limitation on experimental construction
The elimination of the duplication of aerial functions and facilities by government departments.
A country wide Air Mail system of trunk lines connecting the principal cities of the country. *Retirement law for air mail pilots.
Establishment of a National Airway System through cooperation of the Federal Government with States and Cities. *A landing field in every large city
A national aircraft law that will regulate aviation, administered by practical pilots and experienced aeronautical engineers. *and federal air police.
Membership of the United States in the International Convention for Air Navigation.
*Increased governmental appropriations for aerial development.
*Encouragement of aviation rather than subsidy.

COMMERCIAL AIRCRAFT OPERATION.

Creation of commercial air lines by private enterprise or government subsidy.
Encouragement of participation by private companies in aircraft races and competitions.
Encouragement of the training of pilots by civilian schools.
Creating an Esprit de Corps among flying men all over the country by frequent gatherings at aviation meets.
*Encouragement of safe and sane flying.

INDUSTRIAL AIRCRAFT CONSTRUCTION.

Recognition that a sound aeronautical industry is a prime necessity of our National Defense.
An active industrial association that will coordinate the aircraft industry and defend it from attack.
Encouragement of the designing of new types of aircraft by manufacturers by allowing them to retain their proprietory rights.
Concentration of manufacturing firms on specialized types of army and navy aircraft. *When production demands are heavy.
Encouragement of research by constructors, universities and other agencies as well as by the government.
Encouragement of an annual design competition for commercial aircraft.

CIVILIAN.

A national aeronautical organization composed of public spirited citizens that will take a strong position of leadership on national aeronautical policy. *Unification of all aeronautical organizations into one national association with chapters in all cities and towns.
An Annual Aviation Week during which the country will think of aerial progress. *52 such weeks.
The formation of local aero clubs by fliers for the purpose of stimulating flying in all localities.
Encouraging the public to fly and patronize the air mail and transport facilities.

*Suggested changes

PUBLISHER'S NEWS LETTER

The aircraft industry will read with interest that the Naval Aircraft Factory is full of work until December. The Philadelphia account of this satisfactory condition states.

"The aircraft department of the Navy at League Island Navy Yard is one branch of the service where everything is keyed up to the top notch. Orders have been issued not to take on any more business for immediate delivery. The different branches of the service have been notified that every available space for new and repair work is filled up until December. The department is experimenting daily with new devices, which, after trial and acceptance, are stored away."

There has been a great deal of criticism and comment on the McCook Field situation and the expenditures of the Engineering Division of the Air Service. A visit to the field shows that the size of the personnel has been cut very greatly, and there is a very definite tendency toward curtailment in all departments, especially in those of aircraft design and manufacture. The payroll has been reduced, we understand, to $1,800,000 a year for civilian employees.

Compared with this retrenchment the Naval Aircraft Factory is reported to have "every available space for new and repair work filled up until December." The distressing part of the Naval Aircraft Factory problem is that it is so closely interwoven with the League Island Navy Yard. It does not come under the immediate direction of the Bureau of Aeronautics but is run as a separate factory. It makes bids for work just as the civilian aircraft factory bids are made. This is a different procedure than that in effect at McCook Field where the entire work is under the direction of the Chief of Air Service.

* * * *

Navy yards have been regarded for many years as having a strong political aspect. It is only natural that the local politicians are interested in the welfare of their constituents, especially when they are on the government pay roll. Any efforts to decrease the number of workmen on the pay rolls brings in its wake a political manifestation that is difficult to view on the merits of the case alone. The situation in Pennsylvania is peculiarly sensitive and the steady flow of work to the Naval Aircraft Factory has doubtless resulted to a certain extent from influences entirely outside of the aeronautical necessities of the moment.

Politics and government establishments have always been closely aligned, wherever located, so that the effect on the Naval Aircraft Factory has probably been no greater than in any other government plant. It only comes to the attention of the public when there appears to be favoritism shown that might have its root in political activity.

The method of competitive bidding of the Naval Aircraft Factory for aircraft contracts has been generally criticized by the aircraft industry. Not being required to carry some of the overheads that have to be included in the bids of the competing civilian companies, such as depreciation, insurance and reserves for slack periods, having no interest on investment or stockholders to consider, the prices that could be quoted have obviously been out of line with the civilian bidders.

* * * *

AVIATION has consistently opposed the government manufacture of aircraft at McCook Field, at the Pensacola Air Station, at the Air Mail repair station at Maywood and at the Naval Aircraft Factory.

It has been evident that the work of government factories has not been progressive, nor has it contributed greatly to the problem of National Defense as a war resource.

The products of government design and construction have had a small influence on aeronautical progress since the War. So much so that the Army Air Service and the Air Mail have decided to rely on the civilian factories for any new equipment. That a similar policy will be adopted by the Navy is predicted by those who are in a position to observe the trend of events.

* * * *

That the world is aware of the deficiencies of American aviation is evident from the following editorial in the Paris *Herald*. It needs no comment.

"The United States of America spent last year $67,241,000 on the government aviation equipment and personnel. Nevertheless what this great sum has procured for the nation is far short of what it should be. France in the same period spent only the equivalent of $21,000,000 on military aviation and yet has the largest air fleet in the world. Great Britain spent $63,000,000, and the British journals are constantly complaining of the inadequacy of its preparation against surprise attack from the air.

"In America inquiry is very pertinent as to why, with all our large expenditure, we are behind other nations in what may prove to be the most essential element of defence in future warfare.

"There is lack of coordination on the part of the army, navy and postal flying services. Each is distinct from and independent of the others. There are no general laws prescribing regulations for civilian flying, preventive of accident due to carelessness or lack of skill.

"There is evident need here of the earliest possible Congressional action."

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